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AUTHOR Martin, Guy N.; Clark, Michal C.
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ABSTRACT

The R&D Center in Teacher Education at the University of Texas is attempting to make significant contributions to teacher education through the development of teacher education modules. In order to make the most of their effort, a shift in focus from project to program is needed. This paper describes the development of a conceptual focus and a systematic process of development and quality control for module development. The system, which includes a means of constant, on-going evaluation of modules in production; methods for recycling projects that are not developing within acceptable tolerances; and a quality assurance program which assures adequate, controlled testing procedures for products is explained in detail. In addition, new personnel and new roles for existing personnel, how these roles fit into the development scheme, and what effects these changes will have on individual productivity are discussed. (Author)

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Paper presented to AERA Convention, Minnesota (Minneapolis)

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The R&D Center is attempting to make significant contribution to teacher education through the development of teacher education modules. In order to make the most of their effort, a new focus is needed, a shift from project to program focus. This paper describes the development of a conceptual focus and a systematic process of development and quality control for module development. The system, which includes a means of constant, on-going evaluation of modules in production, methods for recycling projects that are not developing within acceptable tolerances, and a quality assurance program which assures adequate, controlled testing procedures for products is explained in detail. In addition, the author discusses new personnel and new roles for existing personnel, how these roles fit into the development scheme, and what effects these changes will have on individual productivity.

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Guy N. Martin
and
Michal C. Clark
Research and Development Center for Teacher Education
University of Texas
Austin, Texas

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"Today's educators are in much the same situation as Peanuts' Lucy when Charlie Brown informed her that those who get the most out of life are those who try to accomplish something. Lucy was astounded. 'Accomplish something? I thought we were just supposed to keep busy.' Keeping busy in education is no longer sufficient. Accountable improvement is the current watch word." (Schulz, 1970).

The R&D Center for Teacher Education is an institution which desires and is attempting to bring about accountable improvement in teacher education. This paper deals with three aspects of the Center which have been helpful in shifting from a project focus to a program focus and hence, in increasing the probability of our making accountable improvement in teacher education. The definition of a module as a format or "media" which is separate and distinct from the instructional activities that the module may contain, the development of a conceptual focus, and a systematic process of development and quality control seem to be powerful tools in making this transition.

Hemphill (1970) has made the distinction that project management deals with the execution of a set of planned activities while program management deals with the attainment of objectives. This same distinction seems to apply to the focus of a research and development effort. Hence, a programmatic focus better allows us to address our goal of bringing about accountable improvement in teacher education. As true of most university-based educational research, the Center was originally organized around the projects in which its members were involved. The transition toward a programmatic focus has been slow and often painful. We have not yet achieved a management structure and operating procedures which we regard as a final answer in enabling us to work as a coherent unit toward achieving our goals. However, the above mentioned and below discussed tools have been helpful in our progress toward the development of a highly personalized, modular teacher education program--our programmatic focus.

A module is defined as a format or media which is separate and distinct from the instructional activities that a module may contain.

A module then contains a set of instructional materials. This definition can be elaborated upon by discussing some of the characteristics of a module.

First, a module must "fit" into the conceptual focus of the Center. Second, objectives must be clearly stated in behavioral or performance terms. The set of objectives for a given module must be comprehensive so that when a teacher trainee has achieved all objectives in a module, he will have achieved the goal or purpose of the module. Third, a module must contain sufficient diagnostic materials to assess performance with respect to objectives. This assessment material must be adequate to provide decisions for branching if there is individualization within the module. Fourth, the necessary instructional materials must be clearly specified and should be included in the modular package. The instructional activities should use a media form which is most effective and efficient in bringing about the desired learning. Fifth, the module must contain materials or make provisions for arousal of teacher trainee concern for its content. This implies a dimension of arousal-resolution within a module. This arousal-resolution dimension, especially when a given concern extends across modules, seems like a powerful tool for maintaining teacher-trainee interest in the program. Sixth, a module is the most meaningful unit of instruction in the program. It is not intended that a module be restricted to a certain number of pages, words, feet of film, etc. or time limit. The size of a module is a function of the number and complexity of objectives. Within a given module the objectives must all be related in that they must define a more general goal or purpose which directly relates to the conceptual focus of the program. This constraint on objectives ensures that a module will be a meaningful unit of instruction that is nearly as small as it can be without detracting from meaning. Seventh, a module must be field tested before it can be distributed for general use. This testing and revision ensures that a module is useable and effective. Eighth, a module must include sufficient documentation for the user. It must provide clear instructions for its use, and should

present relationships between it and other modules. Descriptive characteristics must include such information as average time to completion, necessary materials, prerequisites and condition under which the module will be most effective. Ninth, a module must be self-contained. That is, it must contain sufficient materials to be used independently of the Center's model program. This self-contained package property allows an individual module or any set of modules to be used by the teacher educator who wants modules for some specific purposes, but who does not want to use the model program in its entirety.

To more fully explain some of the ramifications of a modular teacher education program, the relationship between this descriptive definition of a module and a conceptual framework for a modular teacher education program needs to be further specified. The conceptual framework specifies a set of competencies to be attained by a teacher. From these competencies a set of specific instructional goals can be derived. A module would address a goal, and the module's objectives would operationally define the goal. A competency is then operationally defined by all of the objectives contained in the modules within the competency. The assessment of performance in every module should be adequate so that successful completion of the set of modules for a given competency ensures achievement of that competency. Hence, modules become the media for bringing about competency attainment. It is hoped that as the system develops, more than one module directed toward each goal will be available to allow for greater individualization in the modules a teacher trainee uses to attain the necessary competencies.

The Center's conceptual framework can be summarized as a matrix in which the rows represent a sequence of concerns of teacher trainees and the columns reflect areas of professional preparation. All of the modules produced by the Center can be located within this matrix. The point-in-time location of each teacher trainee can also be identified within the matrix. Such a conceptual scheme offers to the researcher and developer a well-defined "ball park" into which his activities must be located. It offers to the teacher trainee and the trainee's supervisor a detailed and meaningful roadmap of the professional

training program.

The construction of a conceptual framework for a group of diverse and university-based researchers is at best a difficult task. It requires loyalty to a common statement of purpose as well as adoption of certain standardized operating procedures. The Center's conceptual framework has facilitated the management of a disciplined, balanced and cohesive approach to the Center's goal. It has enabled the specification of needed research and development activities which in turn has resulted in increased efficiency in the use of resources. While designating needed areas of research and development and organizing them to facilitate planning, the conceptual framework remains sufficiently flexible to allow individual modules to reflect the professional biases of the developer. The developer must conform to criteria dictated by the conceptual framework and the definition of a module, but within limits, his product still can reflect "his own thing." This flexibility exists largely as a function of each developer having had some input into the conceptual framework.

A systematic process of development and quality control greatly assists the center in developing its modular teacher education program. The systems we are adopting are actually quite simple. They deal with production, quality control and quality assurance.*

Production refers to the process of module development. The ideas of the developer must be translated into a hard copy product. Our production system deals with facilitating this task for the developer in a way that also allows adequate planning for the use of available resources in an efficient manner.

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*A comprehensive statement of these systems is forthcoming this spring. Clark (1969 b) presents a brief description.

Quality control is a process which is designed to insure the effectiveness and acceptability of each product. Quality control involves insuring that each product meets all relevant criteria dictated by the conceptual framework and a systemmatic development process which relies upon empirical evaluation to establish the validity and reliability of each product. Extensive editorial evaluation is used throughout development to increase the probability of each product being successful. Products are revised in accordance with the results of evaluation data. Therefore, reviewing the product as it develops provides professional input leading to continual improvement of the product until it is completed in prototype form. Then, pilot testing and field testing with subsequent revision and further testing as necessary guarantees that the product will become effective and acceptable before widespread diffusion is attempted.

Quality assurance is a form of process control which is designed to see that a well developed product is implemented and used properly. Proper use requires that the product be used only in situations for which it was designed. Quality assurance provides monitoring of implementation of the product. The data from this monitoring can be used to check the operating effectiveness of the product, to "debug" the product, to validate a more generalized use of the product, to provide a basis for continual up-grading, etc. We envision quality assurance primarily as a mechanism for data acquisition in widespread field test situations.

These three concepts should be clarified by briefly considering the "systems" we are developing to deal with each of them. The production system specifies product development as a series of small, specified activities. This series of activities is being condensed at the present time into a twenty step flow chart. This flow chart provides a mechanism for monitoring progress of the various products and a starting point for planning manpower utilization. As each module is started, a production plan is filed with the management of the Center. This production plan briefly describes the module and specifies completion dates for each of the development steps in the flow chart. Then,

as the developer completes each step on each product, he notifies the Center management. This enables the Center to know the current state of development of each product which in turn can be related to the developer's original schedule, changes in resource availability, new demands on the Center, etc.

Using this system, module developers are no longer faced with an open ended, ill-defined task. It is anticipated that the description and monitoring of developmental activities by the system encourages individual module developers to produce more modules. By defining each step clearly in terms of specifiable activities and/or sub-products, all modules should have the necessary degree of uniformity with respect to the above definition of a module. Provision is made so that a product need not go through steps which are irrelevant to that product. Each module developer is able to maintain his own style wherever uniformity in the products is not necessary.

A quality control system interfaces with this production system. Quality control is a two-fold problem when applied to module development. First, each module should demonstrate a high level of quality. That means certain procedures need to be set up to monitor development and production of prototype modules in order to ensure that each module meets all of the specifications of a module within the conceptual framework. Second, once the module has been developed procedures need to be available to insure that the module will be implemented as designed. Both of these problems become crucial in that unless all the procedures are efficient and effective, an unbearable manpower and resource drain will be required to maintain production and quality control systems. We feel that our quality control and quality assurance systems are well on the way to becoming the effective and economical systems which are necessary.

The basic strategy for the quality control system is to extract the product in the development process at various steps for critical examination. The purpose of this examination is to ensure that the product meets specifications within acceptable tolerance limits. If it does not, it must be recycled to the appropriate step in the

development process at various steps for critical examination. The purpose of this examination is to ensure that the product meets specifications within acceptable tolerance limits. If it does not, it must be recycled to the appropriate step in the development process. Much of this examination is built into the module production system. However, to assure a sufficiently high degree of objectivity, points for extraction in this process are being specified. At each of the points, the current sub-product in the module-development activity will be examined with respect to a set of defined criteria. A report on this examination will be filed with both the Center management and the module developing group.

The purpose of this quality control system is both to insure that each module meets necessary specifications and to help the module builder continually increase his probability of producing an effective module. It should be noted that a module's quality (effectiveness in bringing about achievement of its objectives) results primarily from the rigorous empirical testing procedures dictated by the production system. The quality control system then helps the module builder achieve such quality and ensures that the module is compatable within the modular teacher education program.

The strategy for the quality assurance system is to develop training and skilled maintenance programs for people we will label as Quality Assurance Specialist (Q.A.S.)*. The Q.A.S. will be an employee of the implementing institution who will be trained to oversee the implementation and to carry out the specific types of evaluative data collection required with respect to the operation of the program (set of modules) in his institution. The training programs should be quite simple and train the Q.A.S. to respond in specified ways. The skill maintenance programs will make extensive use of simulation-testing situations. Through these programs, the module developer should be able to be certain that the Q.A.S. will be responding to situations in a highly reliable fashion. The R&D Center will have one "meta-Q.A.S." who will monitor the Q.A.S.'s to see that their performances achieve the desired degree of uniformity and reliability. The meta-Q.A.S. will also serve as a trouble-shooter for this aspect of the quality assurance system.

*With respect to quality assurance, we have largely developed our ideas in cooperation with the Southwestern Cooperative Educational Laboratory in Albuquerque, New Mexico.

The development of this latter type of quality assurance system has an advantage in addition to its facilitating implementation of modules. The use of the Q.A.S.'s could prove to be sufficiently acceptable and economical so that this procedure could become a standard method for field testing sets of modules. Both the quality control and quality assurance systems are undergoing continual development so as to be consistent with data collected about their usage.

The production and quality control systems are essential in helping this Center move toward its programmatic focus. These systems necessitate coordination among center sub-programs (derived from previous projects). Presumably, this coordination will facilitate cooperation among members of different project groups as they are reformed into new sub-program groups. From a management point of view the systems should greatly facilitate planning, scheduling and accounting based on the program goals rather than simply on project-labeled activities.

The definition of a module, conceptual framework and these management systems are all tools that are helping the Center shift to a programmatic focus. It must be noted that many of the problems in this transition arise out of the necessity for changing Center personnel. A programmatic focus is somewhat new to university-based educational R&D efforts. Cooperation from previously autonomous individuals or small groups is difficult to obtain. These tools do not guarantee our success in making this transition. They do seem to be facilitating it. So, we simply offer them as suggestions for other organizations who wish to achieve a programmatic focus in research and development efforts in teacher education.

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